

Water Unit Rubric – 1996

Student's Name _____

	Page name	points			
1	permission form				
2	Agenda Pages				
3	KWL page				
4	Water Tasting				
5	Field Trip				
6	Field Trip				
7	Field Trip				
8	Video / Movie				
9	Video / Movie				
10	Video / Movie				
11	Speaker Form				
12	Speaker Form				
13	Speaker Form				
14	Speaker Form				
15	Speaker Form				
16	Speaker Form				
17	Speaker Form				
18	Speaker Form				
19	Speaker Form				
20	Bingo				
21	Blue-What IF..-H2O sources				
22	Blue-Water Sources to End				
23	Regatta				
24	Mighty Great Lakes				
25	Orange Pages				
26	Fishy Fact Wall				
27	Universal Solvent				
28	Dew Point				
29	Polar Molecule				
30	Distillation-tube				
31	Know about H2O				
32	Water Tally				
33	Graphing				
34	Great Lakes Math				
36	Extra				
36	Extra				
	Total Points		Percentage	x	

Robert L. Nickels Middle School
PARENT PERMISSION FORM FOR FIELD TRIP PARTICIPATION

Dear Parent or Legal Guardian:

Your son/daughter is eligible to participate in a school-sponsored activity requiring transportation to a location away from the school building. This activity will take place under the guidance and supervision of teachers from Nickels Middle School. During the two week period of March 13 through March 24, the Seventh Graders will be taking two different field trips. A brief description of both activities follows.

Name of Events: Seventh Grade Water Unit.

Destinations:	Trip #1	Trip #2
	Mr. VanderMoere's House	G.R. Water Treatment Plant Waste Water Plant

Designated Supervisors: Seventh Grade Staff

Date and Time of Departure:	March 14 - 8:10	March 23 - 8:30
	March 14 - 12:00	

Date and Time of Return:	March 14 - 10:00	March 23 - 2:10
	March 14 - 2:10	

Method of Transportation:	Walk	School Bus
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Student Cost:	None	\$3 - \$4 for lunch at McDonald's
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If you would like your child to participate in this event, please complete, sign, and return the following statement of consent and acknowledgement. As parent or legal guardian, you remain fully responsible for any legal responsibility which may result from any personal actions taken by the named student.

(Student's Name)

(Parent's Signature)

(Date)

PLEASE RETURN THIS ENTIRE FORM BY MARCH 9, 1995

Teacher's Vocabulary List

Aquifer - large water source located underground

Surface water - water laying on top of the ground (ex. lakes, rivers, ponds)

Coagulation - process by which lime and alum cling to particles in the water

Sedimentation - process by which floc particles settle to the bottom of a large tank or basin

Disinfection - process by which chlorine or other chemicals kill germs

Aeration - process of adding large amounts of air to a mixture of waste water, bacteria, and microorganisms.

Chlorination - process by which chlorine is added to kill germs

CSO - combined sewer overflow

water main - large pipe which carries water to consumers

bay - a arm of a body of water

rapids - swiftly flowing river water

volume - measure of a quantity something can hold

turbidity - muddiness

properties - qualities or characteristics

solvent - a liquid that can dissolve other substances (water is called a universal solvent)

percolation - the process of water moving downward through openings in the soil

evaporation - the process in which a liquid becomes a gas

ground water - water under the ground (ex. spring or well)

flocculation - the process where particles stick together to form larger particles called floc

filtration - the process in which particles are removed by passing water through layers of sand and gravel

electrode - one of the terminals of a battery

ground subsidence - an area where too much water has been removed from a aquifer causing the ground to sink

sludge - solid material collected from the primary sedimentation tank

effluent - water that is released from the water treatment plant

water valve - a giant faucet used to control or shut off water in water mains

river mouth - place where a river empties into a larger body of water

river source - place where a river begins

retention basin - temporary storage area needed to hold excess waste water during times of heavy rainfall

dew point - temperature at which air becomes saturated

soluble - able to be mixed with water

relative humidity - comparison of how much water vapor is in the air to how much it could hold if saturated

electrolysis - process used to separate water into elements

saturated - totally full

pollution - anything that causes a substance to become unusable

regatta - a sail boat race

characteristics - traits

transportation - system by which water is distributed to consumers

reservoirs - large tanks used for storing water until it is needed

distillation - the evaporation of a solvent, transporting it to another place, and condensing it

hydrology - the study of the water cycle

humidity - amount of water in the air

ANSWER KEY (Great Lakes Math)

1. a. 144,000 b. 624,000
2. 20,288,000
3. 4
4. 6
5. 1,000,000
6. 28,308
7. 750
8. 35
9. 42
10. a. 540 b. 600
11. 1,864,000
12. 60,000,000
13. $3 \frac{1}{3}$
14. 119.2
15. 715.2
16. 114,837,000
17. \$183 billion
18. 18,800
19. 16%
20. a. 57.5 b. 69

What Do You Know About H₂O?

1. How much of the water on the Earth is usable?

- A. 50%
- B. 30%
- C. 10%
- D. 1% or less

(317 Million square miles of water/ 1/2 of 1% is usable / 16 billion gallons are used per day in U.S.)

-D -

2. How much water does a tree give off in 24 hours?

- A. 10 gallons
- B. 40 gallons
- C. 70 gallons

- C -

3. How much water is in 1 inch of rain that has fallen on 1 acre of land?

- A. 27,000 gallons
- B. 17,000 gallons
- C. 7,000 gallons

(enough to keep a human alive for 30 years / 2/3 of all rain runs into the sea) - A -

4. Where is most of the Earth's usable water found?

- A. reservoirs
- B. lakes and rivers
- C. underground

(80% of all cities use underground sources for water / underground water is 30x greater than all lakes and streams combined / 88 billion gallons a day is taken from underground) - C -

5. T or F Underground water would never get as polluted as above ground (surface water).

(2 glasses of pollutants would ruin 1/2 million gallons of water / toxic materials once in underground water fails to dilute and disperse) - False -

6. Which source of water supplies us with the most drinking water?

- A. The Great Lakes
- B. Mississippi River
- C. Ohio River

(Great Lakes supplies 15 million people, Mississippi 9 million, and Ohio 11 million) - A -

7. Which of these cities has to travel the greatest distance for water?

- A. New York
- B. Los Angeles
- C. Chicago
- D. Houston

- B -

8. Who uses the most water?

- A. Farmers
- B. Industry
- C. Power Plants
- D. You and Me

(15,000 gallons to produce 1 bushel of wheat, 6,000 gallons for one dozen eggs) - A -

9. Which state uses the most water per person?

- A. New York
- B. Idaho
- C. California
- D. Hawaii

- B and D - (tie)

10. How much of sewage is pure?

- A. 30%
- B. 60%
- C. 90%

(it could be 99% - it only takes 1% to turn water into sewage - C -

(Water Factory in California makes usable water from sewage using reverse osmosis)

11. How much water is used in producing a typical meal?

- A. 1 gallon
- B. 25 gallons
- C. 50 gallons
- D. 3,000 gallons

(to produce serving of veal - 2,600 gallons, chicken - 400 gallons, salad - 6 gallons, margarine - 90 gallons, melon and milk 100 gallons / Sunday newspaper - 150 gallons, car - 39,000 gallons, 4 tires - 2,100 gallons / we lose 1,000 gallons per hour with a running faucet - a million gallons with an open hydrant) - D -

12. How much water do we flush down the toilet?

- A. 2 gallons
- B. 5 gallons
- C. 7 gallons
- D. 10 gallons

(New water saving toilets now use as little as 1.6 gallons) - B -

13. T or F Dishwashers use twice as much water as doing the dishes by hand.

(dishwasher takes 15 gallons - hand washing takes 30 gallons) - False -

14. T or F Taking a ten minute shower instead of a bath will save water.

(a shower uses 10 gallons a minute / a bath uses 40 gallons) - False -

15. How much water is used during an average shave?

- A. 5 gallons
- B. 10 gallons
- C. 15 gallons
- D. 20 gallons

- C -

16. How much water is used sprinkling a lawn?

- A. 50,000 gallons
- B. 100,000 gallons
- C. 200,000 gallons
- D. 400,000 gallons

(a sprinkler uses 100 gallons per hour) - C -

17. How much water does it take for a car to go through a car wash?

- A. 20 gallons
- B. 40 gallons
- C. 60 gallons
- D. 100 gallons

(160 million gallons a year are used to wash cars) - B -

VOCABULARY BINGO

1. Instruct students to provide definitions that agree with the teachers' list of water vocabulary.
2. Direct students to write a different vocabulary word in each of the empty boxes on the BINGO form. (Students can make more than one form.)
3. Next, direct students to "number a blank paper one through _____ depending on the number of words on the teachers' vocabulary list. (Teacher should have at least 26 words.)
4. Teacher calls on each student and asks the student to provide a number from the sheet the students have "numbered." If "Johnny" says, "number four," then all students cross out number four on their numbered sheet. (If another student isn't paying attention and calls out number four when they have their turn, then they are automatically disqualified.) The teacher reads the definition for the number called and the students search their BINGO form to POSSIBLY locate the term. Students place a marker or just X out the term.
5. Continue play until a row is completed. Play can also continue until a student has filled in his/her entire form.

1.	19.
2.	20.
3.	21.
4.	22.
5.	23.
6.	24.
7.	25.
8.	26.
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	

"numbered sheet"

Teacher's Master List	
You Say...	Bingo Term
1. "Water as gas in the air"	Water Vapor
2. "Relating to water"	Hydrologic
3. "Water under the ground; spring or well water"	ground water
4. "Race using sail-boats"	regatta
5. "Water vapor becoming a liquid"	condensation
6.	
7.	

B I N G O				
VOLUME				
BAY				
BASIN		FREE		
REGATTA				
WATER VAPOR				

Some Possible Dry Dock Day Activities For Social Studies

OBJECTIVES:

1. To collect information for our Regatta Activity (Sailboat race) which will be held at the end of our water unit.
2. To learn about the commercial value of the Great Lakes

Read the articles taken from the Michigan History Magazine of Nov/Dec of 1992:

1. "The Dugout"
2. "La Bibliotheque (about the first sailboat on the Great Lakes) THE GRIFFIN"
3. "Boats, Nets and Rigs" (about early twentieth century commercial fishing on Lake Michigan)
4. "Hauling Wind and Heaving Short" (about the interesting "language of the lakemen")
5. "Ships of the Great Lakes" (about commercial shipping on the Great Lakes since the War of 1812)

THE GRIFFON a painting by Robert Thom; provided by Michigan Bell Co. in 1964

1. What we do: Study the painting and list what we should see and things we should learn.
Where? Sheltered water off St. Ignace

What? On the "prow" of the ship is the figurehead of a "griffon" (mythological half-eagle, half-lion) adapted from Count Frontenac's coat of arms.

Also in the foreground are Freight canoes of 35-40 feet long, each could carry 4 tons of cargo plus a crew and provisions.

Who? La Salle, Father Hennepin, Tonty (what details?)

HOW THE GREAT LAKES GOT THEIR NAMES

LAKE MICHIGAN

Named by the Ojibwa Indians. They called it "Big Water". Also comes from *Michhaw* (great) + *Sisigan* (lake).

LAKE ERIE

Named by the Iroquois Indians who were known as the Wildcat Nation. They called it *Lac du Chat* (lake of the cat).

LAKE ONTARIO

Named by the Iroquois Indians. It comes from their words *Onitar io* which means "sparkling or beautiful water".

LAKE HURON

This name came from a French word *Huire* which means "head of a wild boar".

LAKE SUPERIOR

Comes from a French phrase *Le Lac Supérieur* which means "upper lake".

GREAT LAKES INFORMATION

LAKE HURON

- Second largest of the Great Lakes and fifth largest lake in the world
- 30,000 islands, including Manitoulin Island, the world's largest island in a freshwater lake
- surrounded by the world's largest limestone quarries; other major resources include salt, copper, silver and uranium
- major agricultural production region for beans, including 20% of all dry beans grown in the U.S.
- four Areas of Concern, including Saginaw Bay, where sediments are contaminated with persistent toxic substances and algal growth is extreme. Six retention basins will be built under the RAP program to control contaminant sources
- lake water retention time is 22 years

LAKE ONTARIO

- Slightly smaller in area than Lake Erie but much deeper, holding four times the amount of water
- 80% of water supply comes from the upper lakes, the remainder from precipitation
- eight Areas of Concern; Hamilton Harbor, surrounded by one of Canada's largest steel production areas, is heavily contaminated with metals and other toxic chemicals. Contaminated sediments are being dredged and contained and habitat is being restored under the RAP program
- retention time for water entering Lake Ontario is six years

GREAT LAKES INFORMATION

LAKE MICHIGAN

- third largest of the Great Lakes and sixth largest lake in the world
- only one of Great Lakes entirely within the U.S.
- large industrial region at south end and rich agricultural land throughout the Lake Michigan basin; key products include iron ore, steel, limestone, and grain and farm products
- 10 Areas of Concern; primarily in the heavily populated and industrialized southern region; in Waukegan Harbor; \$20 million has been allocated under the RAP program to remove sediment contaminated with PCBs
- although similar in size and depth to Lake Huron, it has a longer retention time of 99 years because water enters and exits through the same path, slowing circulation

LAKE ERIE

- different from the other lakes in that it is shallow, warm/lies on rich soil and averages 95% winter ice cover.
- governmental limits on phosphorus use and improved sewage treatment have reduced excessive algal growth from its highest levels in the 1960s; today the lake has the largest walleye fishery in the world
- large glass and steel production area for both countries - 13 ports also serve as major distribution centers for iron ore, coal and grains.
- nine Areas of Concern, including the Ashtabula River, where a \$25 million project is planned to remove contaminated sediments from the river
- Lake Erie has a retention time of only three years

LAKE SUPERIOR

- world's largest freshwater lake by surface area
- deep, cold, least polluted of the five lakes
- sparsely populated; economically dependent on surrounding natural resources, including timber, metals and recreational opportunities; supplies U.S. with 97% of the country's iron ore
- researchers estimate that 95% of some persistent toxic substances enter Lake Superior from the air
- seven Areas of Concern, including Thunder Bay and the St. Louis River, where local industries are adding new pollution control technologies under the RAP program
- water entering the lake will stay there for almost 200 years

ST. LAWRENCE RIVER

- 1,200 kilometers or 870 miles long, the uppermost 180 kilometers or 110 miles from the U.S.-Canada boundary; the rest is entirely within Canada
- six tributaries nearly double the river's flow, from its beginning as it leaves Lake Ontario to its outflow into the Gulf of St. Lawrence
- 100 years ago, 5,000 beluga whales lived in the river. Today, fewer than 500 exist as a result of commercial whaling and toxic contamination
- two out of three Quebec residents live along the river's shores. More than half of Quebec's industries are located on the shores, drawing over six billion liters or 1.6 billion gallons a day. New York industries withdraw 105 million liters or 28 million gallons of water per day.

*Taken from the Great Lakes - St. Lawrence Our Fragile Ecosystem Chart,
printed by The International Joint Commission*

FACTS ABOUT THE GREAT LAKES

LAKE ERIE

Surrounding states: Michigan, Pennsylvania, Indiana, Ohio, New York.

Major Cities: Detroit, MI; Buffalo, NY; Cleveland, Toledo, OH; Erie, PA; Windsor, ONT.

Shipping ports: Detroit, MI; Buffalo, NY; Ashtabula, Cleveland, Conneaut, Lorain, Sandusky, Toledo, OH; Erie, PA.

Major recreation areas: Bass Islands, OH; Presque Isle, PA; Niagara Falls, NY; National Recreation Area, Cuyahog Valley, OH; National Wildlife Refuge, Ottawa, OH.

Manufacturing: Produces 66% of U.S. cars; a principal steel producing area; glass; ship building.

Agriculture: The economy on the western shore is based on agriculture. Some major products are soybeans, vegetables, wheat, dairy products, grapes, and orchard fruit.

Mining: sand and gravel for construction, limestone, gypsum.

Fishery: second largest Great Lakes sports fishery valued at \$50 million annually. Major species of fish are carp, catfish, whitebass, walleye, yellow perch.

Environmental Problems: toxic substances from industrial discharges lead to fish contaminations and human health risks; heavy metals from industrial discharges (mainly steel and auto) lead to fish contamination, human health risks, and decreased recreational enjoyment; inadequate wastewater treatment; combined sewer overflows.

LAKE ONTARIO

Surrounding states: New York.

Major Cities: Rochester, Utica-Rome, Syracuse, NY; Hamilton, Kitchener-Waterloo, Toronto, Kingston, Ontario.

Major ports: Oswego, NY; Toronto, Hamilton, ONT.

Major recreation areas: Niagara Falls, Thousand Islands, Genesee Gorge, Adirondacks Mountains, Finger Lakes, NY; St. Lawrence Islands National Park, ONT.

Manufacturing: Produces 62% of Canada's steel. World leader in production of photographic, optical, and scientific equipment in Rochester, NY. Other products include machinery, electrical goods, transportation equipment, printing and publishing industries.

Agriculture: Some major products are fruits, vegetables, livestock, dairy products, and grapes.

Fishery: Major species of fish are yellow perch, white perch, sunfish, bullhead, and smelt.

Environmental Problems: Inadequate wastewater treatment and combined sewer overflows from coliform bacteria lead to human health problems; Toxic substances (PCB's) from industrial discharges and hazardous waste disposal lead to fish contaminations and human health risks; Heavy metals such as zinc and iron from mining operations lead to fish contamination and human health risks.

LAKE MICHIGAN

Surrounding states: Michigan, Illinois, Indiana, Wisconsin.

Major Cities: Chicago, IL; Green Bay, Milwaukee, WI; Gary, South Bend, IN; Muskegon, Grand Rapids, Lansing, MI.

Shipping (products): iron ore, coal, steel, grain, and farm products.

Major ports: Chicago, IL; Escanaba, Ludington, and Muskegon, MI; Gary, IN; Green Bay, Milwaukee, WI.

Major recreation areas: Indiana Dunes, IN; Sleeping Bear Dunes, MI; many forests, islands, and fine beaches.

Manufacturing: Produces 50% of the nation's steel and 25% of U.S. paper production. It is an important printing and publishing center.

Agriculture: a leading U.S. grower of fruits, vegetables, dairy products, dry beans and other agricultural goods.

Mining: sand and gravel, limestone, and dolomite.

Fishery: revenues from sports fishery valued at almost \$250 million. Major species of fish are chinook and coho salmon, brown and lake trout, northern pike, walleye, bass, and perch.

Environmental Problems: Organic pollution and coliform bacterial from inadequate wastewater treatment and combined sewer overflow lead to human health risks. Toxic substances (PCB's and mercury) from industrial discharges lead to fish contamination, human health risks, and economic impacts. Loss of wetlands from agricultural drainage lead to loss of wildlife habitat and recreation areas and erosion.

LAKE HURON

Surrounding states: Michigan

Major Cities: Bay City, Saginaw, Detroit, Port Huron, Midland, Alpena, Cheboygan, MI; Sudbury, London, Sarina, ONT.

Shipping (products): copper, platinum, and silver.

Major ports: Detroit, Port Huron, Alpena, Saginaw, Sault Ste. Marie, Port Dolomite, Prewque Isle, MI; Goderich, Depot Harbor, ONT.

Major recreation areas: AuSable, Carp, Titibawasee Rivers, Mackinac Island, Hiawatha and Huron National Forests, MI; Bruce Peninsula, Georgian Bay, Patogannissing Bay Islands, ONT.

Manufacturing: One of the largest U.S. chemical producers located along the southern shoreline.

Agriculture: One third of the U.S. field and bean crop are grown here. Products are hay, corn, winter wheat, sugar, soybeans, and fruits.

Mining: 17% of the free world's uranium reserves and 4% of the free world's nickel reserves.

Fishery: Major species of fish are yellow perch, whitefish, catfish, chub, and yellow pickerel.

Environmental Problems: Discharges from pulp and paper industry, agricultural runoff, inadequate wastewater treatment, combined sewer overflows, radium and uranium mining leads to human health risks, private development causes inadequate public access to the shoreline.

LAKE SUPERIOR

Surrounding States: Michigan, Minnesota, Wisconsin

Major Cities: Duluth, MN; Marquette, Sault Ste. Marie, MI; Thunder Bay, Sault Ste. Marie, ONT; Ashland Superior, WI.

Shipping (products): iron ore, coal, train, and limestone.

Major ports: Duluth, Taconite Harbor, Silver Bay, MN; Marquette, MI; Thunder Bay, ONT; Superior, WI.

Major recreation areas: National Parks: Isle Royale, MI; Voyageurs, MN; Pukaskwa, ONT.; National Lakeshores: Apostle II's, WI; Pictures Rocks, MI; National Forests: Superior, MN; Chequamegon, WI; Ottawa, MI; Hiawatha, MI.

Manufacturing and Lumbering: This is an important pulp, firewood, paper and board producing region of the U.S.

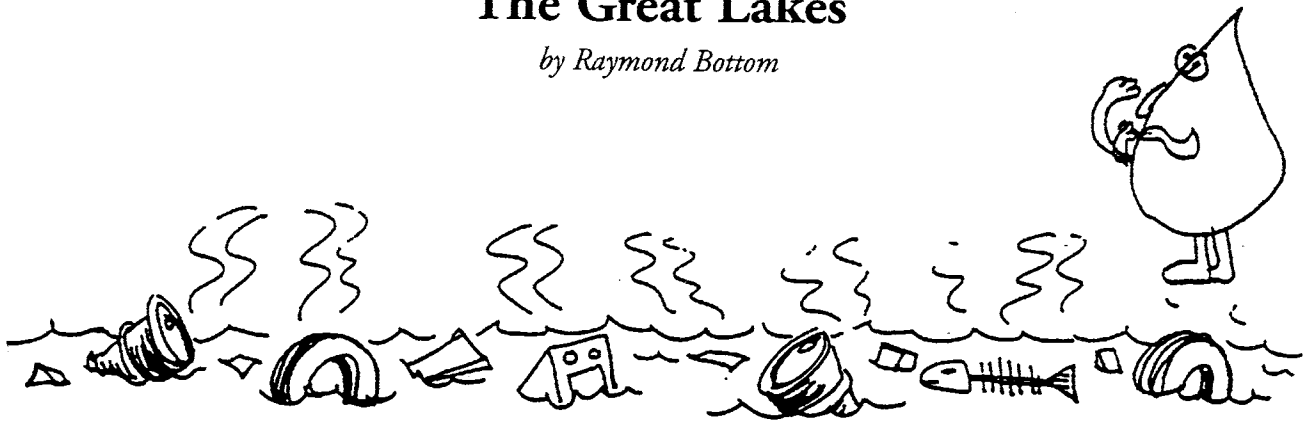
Mining: Supplies the U.S. with 80% of its iron ore. Products 5% of the world's copper and contains major reserves of nickel.

Fishery: Third largest sports fishery in the Great Lakes. Major species of fish are chub, brown trout, chinook salmon, coho salmon.

Environmental Problems: Asbestos fibers from mining operations lead to fish contamination. Red clay erosion from wave action and human development activities along the shore leads to destruction of fish spawning beds, property damage, and unsuitable water for fishing and swimming. Private development causes inadequate public access to the shoreline.

The Great Lakes

by Raymond Bottom



You owe a vote of thanks to the Great Lakes for some of the enjoyable things you did today. When you ate breakfast cereal, rode in the car or on a school bus, or took a spin on your bicycle, you were using products that were transported on huge ships that ply the five Great Lakes, the largest group of fresh water lakes in the world.

Geologists tell us the Great Lakes were formed during the Ice Age by huge glaciers, some almost two miles thick, that scooped out enormous basins. When the last glacier retreated about 12,000 years ago, land freed from the weight of the ice formed the lakes Superior, Michigan, Huron, Erie, and Ontario.

Indians living near the lakes found a rich source of food including fish, wild life, vegetation such as wild rice and grapes, and maple syrup. Rich land grew abundant corn, and the water was a broad highway that took them long distances for trading.

Population grew steadily in the eight states bordering the Great Lakes.

Copper was discovered first, then iron ore. There were vast tracts of timber, along with farm products and manufactured goods to ship.

The birchbark canoes of the Indians and the small cargo ships of the early traders were replaced by larger and larger ships, until today there are vessels 1000 feet long and over 100 feet wide which carry over 30,000 tons.

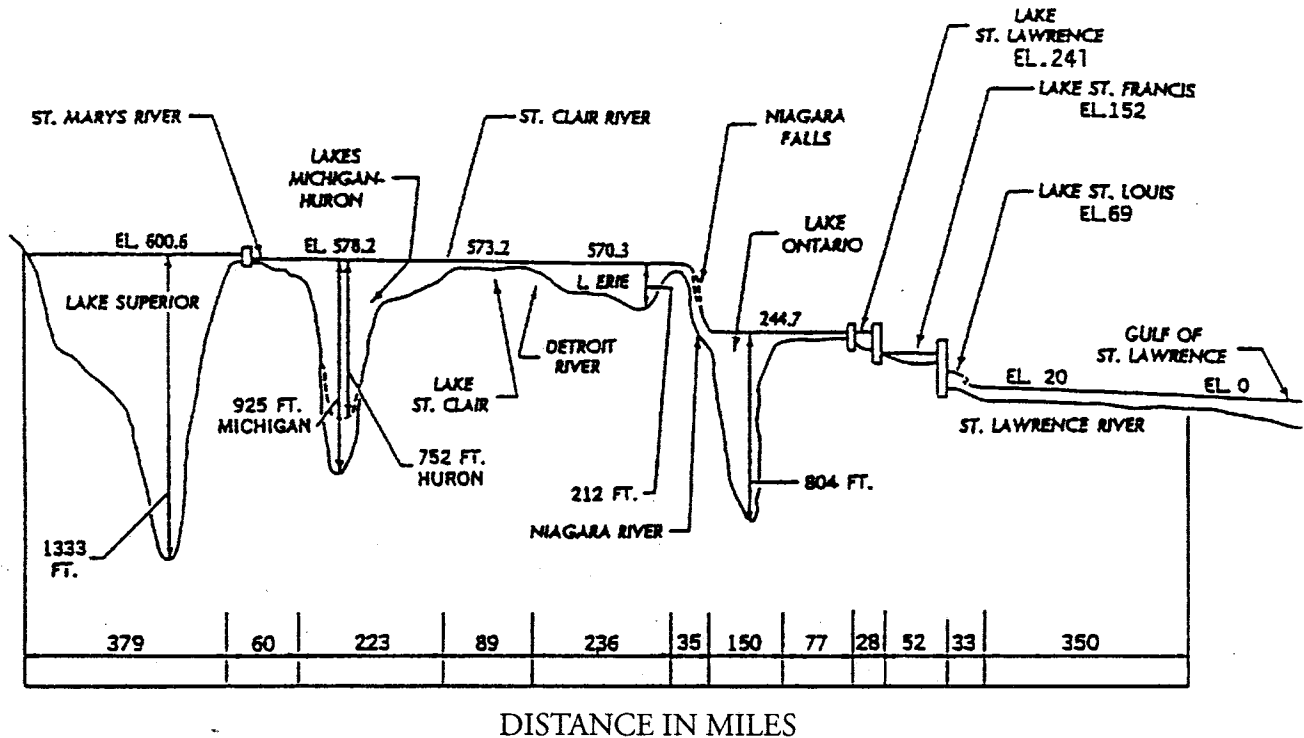
The Great Lakes are also places of danger. ice, sudden storms, high winds and currents, rocks, and rapids have taken many ships and people to watery graves. The last great tragedy was the Edmund Fitzgerald which went down in a violent storm on November 9, 1975. The entire crew of 29 men and a cargo of over 26,000 tons was lost.

Many of the dangers have been lessened by the construction of canals and locks. Improved ship construction and better means of weather prediction and reporting have helped. However the "winds of November," such as the "Big Blow of 1905", the "Big Storm of 1913", and the great storm of 1975 are ample reasons to head for a safe port when the high winds turn the water to raging seas.

The St. Lawrence Seaway has made it possible for ocean-going vessels to visit many Great Lakes ports and ship cargo on the open water to trading nations of the world.

The Great Lakes are in peril today because of the hazardous chemicals, untreated sewage, agricultural runoff, and airborne toxins that are dumped into them. Unless this practice is stopped and billions of dollars are spent on cleanup, plants and animals will die and many of the uses of the lakes will not be available for the next generation. It will take the concern and help of everyone to keep the largest freshwater system on earth fresh and clean.

PROFILE OF THE GREAT LAKES REGION DRAINAGE SYSTEM



Elevations of the Lake surfaces are averages (1900-1977) expressed on international great lakes datum (1955) and are given to the nearest tenth (1/10) foot. Horizontal and vertical scales have been distorted to convey visual impression.

LAKE FACTS

Lake Erie:

Length: 241 mi (387 km)
Breadth: 57 mi (27 km)
Depth: 62 ft (18 m) average,
210 ft (64 m) max.
Volume: 116 cu mi (483 cu km)
Water Surface: 9910 sq mi (25,666 sq km)
Shoreline Length:* 856 mi (1377 km)

Lake Huron:

Length: 205 mi (331 km)
Breadth: 183 mi (294 km)
Depth: 195 ft (59 m) average
750 ft (228 m) max
Volume: 849 cu (3536 cu km)
Water Surface: 23,000 sq mi (59,570 sq km)
Shoreline Length:* 3,180 (5,116 km)

Lake Michigan:

Length: 307 mi (493 km)
Breadth: 118 mi (189 km)
Depth: 279 ft (85 m) average
923 ft (280 m) max
Volume: 1,180 cu mi (4,915 cu km)
Water Surface: 22,300 sq mi (57,757 sq km)
Shoreline Length:* 1,660 mi (2,670 km)

Lake Ontario:

Length: 193 mi (310 km)
Breadth: 53 mi (85 km)
Depth: 283 ft (86 m) average
802 ft (243 m) max
Volume: 393 cu mi (1,637 cu km)
Water Surface: 7,340 sq mi (19,010 sq km)
Shoreline Length:* 726 mi (1,163 km)

Lake Superior:

Length: 350 mi (563 km)
Breadth: 160 mi (257 km)
Depth: 489 ft (148 m) average
1,333 ft (405 m) max
Volume: 2,935 cu mi (11,910 cu km)
Shoreline Length:* 2,980 mi (4,798 km)

FACTS ABOUT BORDERING STATES & PROVINCES

Ontario

Area: 412,582 sq mi
(1,068,588 sq. km.)
Highest Pt: 2,183 ft - Ogidaki Mtn.
(666 m)

Minnesota

Area: 84,068 sq mi
(217,736 sq km)
Highest Pt: 2,301 ft - Eagle Mtn.
(702 m)

Wisconsin

Area: 56,154 sq mi
(145,439 sq km)
Highest Pt: 1,952 ft - Timms Hill
(595 m)
(west of Tomahawk)

Michigan

Area: 58,216 sq mi
(150,770 sq km)
Highest Pt: 1,980 ft - Mt. Curwood
(U.P.) (604 m)

Indiana

Area: 36,291 sq mi
(93,994 sq km)
Highest Pt: 1,257 ft - Wayne County
(383 m)

Ohio

Area: 41,222 sq mi
(106,765 sq km)
Highest Pt: 1,550 ft - Campbell Hill
(473 m)

Pennsylvania

Area: 45,333 sq mi
(117,413 sq km)
Highest Pt: 3,213 - Mt. Davis
(980 m)

New York

Area: 49,576 sq mi
(128,402 sq km)
Highest Pt: 5,344 ft - Mt. Marcy
(1,530 m)
(Adirondack Mt.
East Ridge)

* includes islands

ST. CLAIR

Captain Sam Ward came to Michigan from Vermont, settling at the mouth of the Belle River (Marine City). He built a small schooner "the St. Clair" and sailed about the lakes trading as he went.

Arthur St. Clair: 1791, Revolutionary War General; lost a battle against the Indians in the Northwest Territory. Later became the first governor of the Northwest Territory. Lake St. Clair was named in his memory.

An invasion of fish flies caused several traffic accidents and near misses in Ira Township (St. Clair County) short lived insects collected and died on several roads and conditions were similar to driving on Ice.

St. Clair county is one of the first 10 counties incorporated in Michigan; number 6 in the year 1821.

Mark Wells (St. Clair Shores) in 1980, was forward who played regularly on the ice hockey team of the USA that stunned the Soviets 4-3 and went on to win the gold medal in the 1980 Winter Olympics.

1978 - Seventy five noisy 5th graders jammed into Governor William G. Milliken's office to watch him sign into law their bill protecting house cats from hunters. St. Clair elementary school students had initiated the legislation by writing their state senator letters protesting a 1929 law that made it legal to shoot cats.

1967: A 7 mile section of I-94 opened through St. Clair Shores. The new section completed the 275 mile New Buffalo to Port Huron Highway and made Michigan the first state in the nation to have a border to border interstate freeway.

St. Clair: a river in the North Central U.S. and Southern Canada, flowing South from Lake Huron to Lake St. Clair, forming part of the boundary between Michigan and Ontario, 41 miles long.

Lake St. Clair: A lake between SE Michigan and Ontario, Canada - 460 square miles.

St. Clair Shores: A city in SE Michigan near Detroit with a population of 70,210.

The Detroit River flows south from the south end of Lake St. Clair.

There is a six to seven mile drop in water level along the 41 miles of the St. Clair River.

LAKE ST. CLAIR

Lake St. Clair is located between the St. Clair River and Detroit River in a broad, flat valley that is broken only by three glacial moraines running transverse to the axis of the valley. The heart-shaped lake is fed with water from Lake Huron via the St. Clair River. Outflow from the lake leaves via the Detroit River into Lake Erie. At the north-eastern portion of the lake is an extensive delta system which is the largest within the Great Lakes.

Although its delta is immense, Lake St. Clair is by far the smallest lake in the Great Lakes system. It has a total area of only 28,400 miles and a drainage basin area of 48,000 miles. It is the only lake in the system with such a large drainage basin-to-lake surface ratio (11.1). The other Great Lakes average 2:1. The mean depth of the lake is only 10 feet, with a maximum natural depth of 21 feet and a maximum depth along a dredged shipping channel of 27 feet.

The Michigan portion of the delta has been largely urbanized, whereas the Ontario portion is set aside as Walpole Indian Reservation and is made up mainly of natural wetlands. Most of the water entering

the lake (98%) comes directly from Lake Huron. So the state of the water in Lake Huron is the predominant influence on the quality of the water in Lake St. Clair.

This small lake is an important link in the St. Lawrence Seaway. Because the lake is so shallow, a shipping channel must be periodically dredged to assure bottom clearance for large ships.

ST. CLAIR FLATS

The St. Clair Flats wetlands complex is located on the delta formed at the mouth of the St. Clair River as it flows into Lake St. Clair. About 8,500 acres of wetlands lie on the Michigan side of the border and 20,000 acres lie on Ontario. Major islands in the delta include Walpole Island, Dickinson Island, McDonald Island, North Island, Middle Island, Green Island, Squirrel Island, and St. Anne Island.

On the various islands of the delta, five major and three minor plant zones can be seen. These include from driest to wettest habitat: 1) oak-ash hardwood forest, 2) dogwood-grass zone, 3) sedge marsh, 4) cattail marsh, and 5) bulrush marsh.

Lake Erie and Lake St. Clair wetlands produce more furbearers than the rest of the Great lakes combined.

Two features of Lake St. Clair greatly influence its water temperature. The first is its shallow mean depth. Due to this, Lake St. Clair warms quickly in the spring and cools quickly in the fall. Also because of this, water temperatures are almost always the same from top to bottom. The second is that the water in Lake St. Clair is replaced quickly by inflow from the St. Clair River. The temperature of Lake Huron therefore has a strong influence on the temperature of Lake St. Clair.

During a normal or average winter, the ice charts show that the lake usually has near 100% ice cover in January and February. Ice covers are reduced during March 1-15 and 90 to 100% ice concentration is located in the eastern half of the lake at this time. By the second half of March, the bulk of the remaining ice cover is located along the southeastern shore. The lake is usually ice free during the first half of April.

Exceptional opportunities exist for observing waterfowl and marsh birds at the St. Clair Flats wetlands. These extensive marshes along the northwest shoreline of Lake St. Clair were formed by sediment deposition in the mouth of the St. Clair River.

Anchor Bay, on the Michigan shore, is heavily utilized by migrant diving ducks as a feeding and resting site, particularly in the vicinity of Marsac and Swan Creeks.

